

WHAT IS CLAIMED IS:

1 1. A communications method for use in a communications system including a base station
2 and a plurality of wireless terminals, a different communications channel existing between each
3 wireless terminal in said plurality of wireless terminals and said base station, the
4 communications channel existing between each particular wireless terminal and the base station
5 having a quality which is the channel quality for the particular wireless terminal, the method
6 comprising:

7 operating the base station to:

- 8 i) maintain a set of channel condition information indicating the channel quality
9 of each of said plurality of wireless terminals;
- 10 ii) examine the set of channel condition information to identify wireless terminals
11 having channel conditions which differ from one another by at least a pre-
12 selected minimum amount; and
- 13 iii) assign a communications channel segment to be used to communicate
14 superimposed signals corresponding to at least two different wireless terminals
15 identified as having channel conditions which differ by at least said pre-selected
16 minimum amount.

1 2. The communications method of claim 1,

2 wherein the maintained set of channel condition information includes channel signal to
3 noise ratio information;

4 wherein said at least two different wireless terminals include a first and a second wireless
5 terminal; and

6 wherein the minimum pre-selected amount by which the channel conditions of the first
7 and second wireless terminals differ is 3 dB.

1 3. The method of claim 1, further comprising:

2 operating the base station to repeat said steps of maintaining, examining and assigning.

1 4. The method of claim 1, further comprising:

2 operating the base station to repeat said steps of maintaining and examining; and

3 wherein when said examining step fails to identify at least two wireless terminals having

4 channel conditions which differ by the pre-selected minimum amount having signals to be
5 transmitted in a communications channel segment which is available to be assigned, operating
6 said base station to:

7 assign the available communications channel segment to a single one of said
8 plurality of wireless terminals.

1 5. The communications method of claim 1,

2 wherein said at least two different wireless terminals includes a first wireless terminal
3 and a second wireless terminal;

4 wherein said assigned communications channel segment is a segment of a downlink
5 channel;

6 wherein the first wireless terminal has a better channel quality than said second wireless
7 terminal, the method further comprising:

8 operating the base station to transmit a first superimposed signal to the first and
9 second wireless terminals in said assigned communication channel segment, said first
10 superimposed signal including a low power signal portion intended for said first wireless
11 terminal and a high power signal portion intended for said second wireless terminal, the
12 lower power signal portion being transmitted by said base station with lower power than
13 said high power signal portion or having less coding protection than said high power
14 signal portion.

1 6. The communications method of claim 5, wherein said assigned communications channel
2 segment is a segment of an assignment channel used to communicate communications channel
3 segment assignments to wireless terminals.

1 7. The communications method of claim 6, further comprising:

2 operating said base station to:

3 receive a second superimposed signal from said first and second wireless
4 terminals, said received second superimposed signal including first and second signal
5 portions transmitted by said first and second wireless terminals, respectively, said first
6 signal portion being received by said base station at a higher power level than said
7 second signal portion.

1 8. The communications method of claim 7, further comprising:
2 operating said base station to:
3 decode said first signal portion;
4 subtract said first signal portion from said second superimposed signal; and
5 decode said second signal portion.

1 9. The communications method of claim 7, further comprising:
2 operating the first wireless terminal to determine which one of a plurality of received
3 target power levels to use in determining the transmission power to use to transmit said first
4 signal portion from said first superimposed signal transmitted to said first and second wireless
5 terminals in said segment of an assignment channel.

1 10. The communications method of claim 9, wherein operating the first wireless terminal to
2 determine which one of a plurality of received target power levels to use includes:
3 determining whether the portion of the first superimposed signal used to communicate
4 uplink channel assignment information to the first wireless terminal was transmitted as a low
5 power signal portion or a high power signal portion.

1 11. A base station for use in a communications system including a plurality of wireless
2 terminals, a different communications channel existing between each wireless terminal in said
3 plurality of wireless terminals and said base station, the communications channel existing
4 between each particular wireless terminal and the base station having a quality which is the
5 channel quality for the particular wireless terminal, the base station comprising:

6 a set of channel condition information indicating the channel quality of each of said
7 plurality of wireless terminals;

8 means for examining the set of channel condition information to identify wireless
9 terminals having channel conditions which differ from one another by a pre-selected minimum
10 amount; and

11 means for assigning a communications channel segment to be used to communicate
12 superimposed signals corresponding to at least two different wireless terminals identified as
13 having channel conditions which differ by at least said pre-selected minimum amount.

1 12. The base station of claim 11,

2 wherein said at least two different wireless terminals includes a first and a second
3 wireless terminal;

4 wherein the maintained set of channel condition information includes channel signal to
5 noise ratio information; and

6 wherein the minimum pre-selected amount by which the channel conditions of a first and
7 second wireless terminals differ is 3 dB.

1 13. The base station of claim 11, further comprising:

2 means for assigning an available communications channel segment to a single one of
3 said plurality of wireless terminals when said examining means fails to identify at least two
4 wireless terminals having channel conditions which differ by the pre-selected minimum amount
5 which have signals to be transmitted in the communications channel segment which is available
6 to be assigned.

1 14. The communications method of claim 13, further comprising:

2 a receiver for receiving a superimposed signal from said first and second wireless
3 terminals, said received superimposed signal including first and second signal portions
4 transmitted by said first and second wireless terminals, respectively, said first signal portion
5 being received by said base station at a higher power level than said second signal portion, said
6 first wireless terminal having a better channel condition than said second wireless terminal.

1 15. The base station of claim 14, further comprising:

2 a superposition decoder for decoding said first and second signal portions of the received
3 superimposed signal.

1 16. The base station of claim 15, wherein said superposition decoder includes:

2 a decoder device for decoding said first signal portion;

3 a subtracter for subtracting said first signal portion from said superimposed signal to
4 produce said second signal portion; and

5 a second decoder device for decoding said second signal portion.

1 17. A communications method for use in a communications system including a base station
2 and a plurality of wireless terminals, a different communications channel existing between each

3 wireless terminal in said plurality of wireless terminals and said base station, the
4 communications channel existing between each particular wireless terminal and the base station
5 having a quality which is the channel quality for the particular wireless terminal, the method
6 comprising:

7 operating a first wireless terminal having a first channel quality to transmit a first portion
8 of a superimposed communications signal to said base station; and

9 operating a second wireless terminal having a second channel quality to transmit a
10 second portion of said superimposed communications signal to said base station, the first and
11 second channel qualities being different by at least a first pre-selected amount, said first and
12 second signal portions combining in the air during transmission to the base station to form said
13 superimposed communications signal.

1 18. The communications method of claim 17,

2 wherein the minimum pre-selected amount by which the channel quality of the first and
3 second wireless terminals differ is 3 dB.

1 19. The communications method of claim 1, further comprising:

2 operating the first and second wireless terminals to receive, prior to transmission of said
3 first and second superimposed signal portions, a superimposed assignment signal including a
4 low power signal portion intended for said first wireless terminal and a high power signal
5 portion intended for said second wireless terminal, the lower power signal portion being
6 transmitted by said base station with lower power than said high power signal portion, said first
7 wireless terminal having a better channel quality than said second wireless terminal, said
8 superimposed assignment signal assigning an uplink communications channel segment.

1 20. The communications method of claim 19, wherein the first and the second signal
2 portions transmitted by said first and second wireless terminals, respectively, are transmitted
3 with power levels that cause said first signal portion to be received by said base station at a
4 higher power level than said second signal portion.

1 21. The communications method of claim 20, further comprising:

2 operating the first wireless terminal to determine which one of a plurality of received
3 target power levels to use in determining the transmission power to use to transmit said first
4 signal portion from said superimposed assignment signal.

1 22. The communications method of claim 21, wherein operating the first wireless terminal to
2 determine which one of a plurality of received target power levels to use includes:

3 determining whether the superimposed signal portion used to communicate uplink
4 channel assignment information to the first wireless terminal was transmitted as a low power
5 signal portion or a high power signal portion.

1 23. A wireless terminal including:

2 a receiver for receiving a superimposed assignment signal including a first signal portion
3 and a second signal portion one of said signal portions being intended for said wireless terminals
4 with the other one of said signal portions being intended for another wireless terminal, the first
5 signal portion being received with at a lower power level than said second signal portion;

6 a superposition decoder for decoding said first and second signal portions;

7 means for determining from information included in one of said first and second signal
8 portions which portion is intended for said wireless terminal; and

9 a transmitter for transmitting signals in uplink communications channel segments to
10 which received superimposed assignment signals intended for said wireless terminal correspond.

1 24. The wireless terminal of claim 23, further comprising:

2 stored received target level power information for a plurality of different received power
3 target levels; and

4 means for determining which one of the plurality of received target power levels to use
5 when transmitting a signal in a particular uplink communications channel segment from a
6 received superimposed assignment signal corresponding to the particular uplink communications
7 channel segment.

1 25. The wireless terminal of claim 24, wherein said means for determining includes:

2 determines whether the superimposed signal portion used to communicate uplink
3 channel assignment information to the wireless terminal was transmitted as a low power signal
4 portion or a high power signal portion.

1 26. A communications method for use in a communications system including a base station
2 and a plurality of wireless terminals, a different communications channel existing between each
3 wireless terminal in said plurality of wireless terminals and said base station, the
4 communications channel existing between each particular wireless terminal and the base station
5 having a quality which is the communications channel quality for the particular wireless
6 terminal, signals transmitted from the wireless terminals to the base station combining during
7 transmission between, the method comprising:

8 operating the base station to:

9 assign an uplink communications channel segment to be used simultaneously by
10 a first and second device;

11 receive a composite signal from said uplink communications channel segment,
12 said composite signal including a first signal transmitted by said first device and a
13 second signal transmitted by said second device; and

14 perform a superposition decoding operation on the received composite signal to
15 decode the first and second signals included in said composite signal.

1 27. The communications method of claim 26, wherein operating the base station to assign an
2 uplink communications channel segment includes operating the base station to:

3 select based on communications channel quality information, a first wireless terminal
4 and a second wireless terminal, the first and second wireless terminals having different wireless
5 terminal communications channel qualities, to share an uplink traffic segment; and

6 wherein the method further comprises operating the base station to:

7 transmit to the selected first and second wireless terminals information indicating
8 the assigned traffic channel segment and which one of the first and second wireless
9 terminals should transmit signals to be received by said base station at a higher power
10 level.

1 28. The method of claim 27, wherein the one of the first and second wireless terminals
2 having the better channel conditions is to be received at the base station at the higher power
3 level, the method further comprising:

4 operating the first wireless terminal to transmit to the base station in the assigned traffic
5 channel segment a first signal portion; and

6 operating the second wireless terminal to transmit to the base station in the assigned
7 traffic channel segment a second signal portion, the first and second signal portions
8 superimposing during transmission to said base station.

1 29. The method of claim 28, wherein the first wireless terminal transmits the first signal
2 portion using less power than the power used by said second wireless terminal to transmit said
3 second signal portion but the first signal portion is received by said base station with a power
4 level that is higher than the power level of the second signal portion received by said base
5 station.

1 30. The method of claim 29,
2 wherein said at least two different wireless terminals includes a first wireless terminal
3 and a second wireless terminal;
4 wherein said communications channel segment to be assigned is a segment of a downlink
5 channel;
6 wherein the first wireless terminal has a better channel quality than said second wireless
7 terminal; and
8 wherein the base station further comprises:
9 means for transmitting a superimposed signal to the first and second wireless
10 terminals in said assigned communication channel segment, said superimposed signal
11 including a low power signal portion intended for said first wireless terminal and a high
12 power signal portion intended for said second wireless terminal, the lower power signal
13 portion being transmitted by said base station with lower power than said high power
14 signal portion.